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1 Federated database systems for managing distributed, heterogeneous, and autonomous databases
Amit P. Sheth, James A. Larson
September 1990 **ACM Computing Surveys (CSUR)**, Volume 22 Issue 3
Publisher: ACM Press
Full text available: pdf(5.02 MB) Additional Information: full citation, abstract, references, citings, index terms, review

A federated database system (FDBS) is a collection of cooperating database systems that are autonomous and possibly heterogeneous. In this paper, we define a reference architecture for distributed database management systems from system and schema viewpoints and show how various FDBS architectures can be developed. We then define a methodology for developing one of the popular architectures of an FDBS. Finally, we discuss critical issues related to developing and operating an FDBS.

2 A comparative analysis of methodologies for database schema integration
C. Batini, M. Lenzerini, S. B. Navathe
December 1988 **ACM Computing Surveys (CSUR)**, Volume 18 Issue 4
Publisher: ACM Press
Full text available: pdf(3.41 MB) Additional Information: full citation, abstract, references, citings, index terms, review

One of the fundamental principles of the database approach is that a database allows a nonredundant, unified representation of all data managed in an organization. This is achieved only when methodologies are available to support integration across organizational and application boundaries. Methodologies for database design usually perform the design activity by separately producing several schemas, representing parts of the application, which are subsequently merged. Database sc ...

3 Federated databases and systems: part I --- a tutorial on their data sharing
David K. Hsiao
July 1992 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 1 Issue 1
Publisher: Springer-Verlag New York, Inc.
Full text available: pdf(2.99 MB) Additional Information: full citation, abstract, references, citings

The issues and solutions for the interoperability of a class of heterogeneous databases and their database systems are expounded in two parts. Part I presents the data-sharing issues in federated databases and systems. Part II, which will appear in a future issue, explores resource-consolidation issues. *Interoperability* in this context refers to data sharing among heterogeneous databases, and to resource consolidation of computer hardware, system software, and support personnel. *Resour* ...

Keywords: *attribute-based, data-model-and-language-to-data-model-and-language mappings, database conversion, hierarchical, network, object-oriented, relational, schema transformation, transaction translation*

4 Interoperability of multiple autonomous databases
Witold Litwin, Leo Mark, Nick Roussopoulos
September 1990 **ACM Computing Surveys (CSUR)**, Volume 22 Issue 3
Publisher: ACM Press
Full text available: pdf(2.66 MB) Additional Information: full citation, abstract, references, citings, index terms, review

Database systems were a solution to the problem of shared access to heterogeneous files created by

multiple autonomous applications in a centralized environment. To make data usage easier, the files were replaced by a globally integrated database. To a large extent, the idea was successful, and many databases are now accessible through local and long-haul networks. Unavoidably, users now need shared access to multiple autonomous databases. The question is what the corresponding methodology ...

5 Conceptual schema analysis: techniques and applications

S. Castano, V. De Antonellis, M. G. Fugini, B. Pernici

September 1998 **ACM Transactions on Database Systems (TODS)**, Volume 23 Issue 3

Publisher: ACM Press

Full text available: pdf(350.09 KB) Additional Information: full citation, abstract, references, citings, index terms, review

The problem of analyzing and classifying conceptual schemas is becomig increasingly important due to the availability of a large number of schemas related to existing applications. The purposes of schema analysis and classification activities can be different: to extract information on intensional properties of legacy systems in order to restructure or migrate to new architectures; to build libraries of reference conceptual components to be used in building new applications in a given domai ...

Keywords: conceptual modeling, reference components, schema classification, schema similarity

6 Strategies for database schema acquisition and design

Matthew Morgenstern

January 1981 **Proceedings of the ACM '81 conference**

Publisher: ACM Press

Full text available: pdf(396.93 KB) Additional Information: full citation, abstract, references, index terms

Consideration of the database design process highlights specific problems in requirements determination, development of the overall conceptual schema, and the Data Base Administrator bottleneck. An alternative design strategy is described which first acquires the separate user views and then systematically merges these views to derive the overall conceptual schema. The user views may be specified independently and are not limited to a single data model formalism.

7 InterViso: dealing with the complexity of federated database access

Marjorie Templeton, Herbert Henley, Edward Maros, Darrel J. Van Buer

April 1995 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 4 Issue 2

Publisher: Springer-Verlag New York, Inc.

Full text available: pdf(1.87 MB) Additional Information: full citation, abstract, references, citings

Connectivity products are finally available to provide the "highways" between computers containing data. IBM has provided strong validation of the concept with their "Information Warehouse." DBMS vendors are providing gateways into their products, and SQL is being retrofitted on many older DBMSs to make it easier to access data from standard 4GL products and application development systems. The next step needed for data integration is to provide (1) a common data dictionary with a conceptual sch ...

Keywords: data warehouse, database integration, federated database

8 Heterogeneous distributed database systems for production use

Gomer Thomas, Glenn R. Thompson, Chin-Wan Chung, Edward Barkmeyer, Fred Carter, Marjorie Templeton, Stephen Fox, Berl Hartman

September 1990 **ACM Computing Surveys (CSUR)**, Volume 22 Issue 3

Publisher: ACM Press

Full text available: pdf(2.80 MB) Additional Information: full citation, abstract, references, citings, index terms, review

It is increasingly important for organizations to achieve additional coordination of diverse computerized operations. To do so, it is necessary to have database systems that can operate over a distributed network and can encompass a heterogeneous mix of computers, operating systems, communications links, and local database management systems. This paper outlines approaches to various aspects of heterogeneous distributed data management and describes the characteristics and architectures of ...

9 An experimental object-based sharing system for networked databases

Doug Fang, Shahram Ghandeharizadeh, Dennis McLeod

April 1996 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 5 Issue 2

Publisher: Springer-Verlag New York, Inc.

Full text available: pdf(195.97 KB) Additional Information: full citation, abstract, index terms

An approach and mechanism for the transparent sharing of objects in an environment of interconnected (networked), autonomous database systems is presented. An experimental

prototype system has been designed and implemented, and an analysis of its performance conducted. Previous approaches to sharing in this environment typically rely on the use of a global, integrated conceptual database schema; users and applications must pose queries at this new level of abstraction to access remote informatio ...

Keywords: Database system interoperability, Experimental prototype benchmarking, Object sharing

10 A federated architecture for information management

Dennis Heimbigner, Dennis McLeod

July 1985 **ACM Transactions on Information Systems (TOIS)**, Volume 3 Issue 3

Publisher: ACM Press

Full text available: pdf(2.19 MB) Additional Information: full citation, abstract, references, citings, index terms

An approach to the coordinated sharing and interchange of computerized information is described emphasizing partial, controlled sharing among autonomous databases. Office information systems provide a particularly appropriate context for this type of information sharing and exchange. A federated database architecture is described in which a collection of independent database systems are united into a loosely coupled federation in order to share and exchange information. A federation consist ...

11 Suitability of datamodels as canonical models for federated databases

F. Saltor, M. Castellanos, M. García-Solaco

December 1991 **ACM SIGMOD Record**, Volume 20 Issue 4

Publisher: ACM Press

Full text available: pdf(541.35 KB) Additional Information: full citation, abstract, index terms

We develop a framework of characteristics, essential and recommended, that a data model should have to be suitable as canonical model for federated databases. This framework is based on the two factors of the representation ability of a model: expressiveness and semantic relativism. Several data models are analyzed with repect to the characteristics of the framework, to evaluate their adequacy as canonical models.

12 Linguistic instruments and qualitative reasoning for schema integration

Paul Johannesson

November 1994 **Proceedings of the third international conference on Information and knowledge management**

Publisher: ACM Press

Full text available: pdf(1.07 MB) Additional Information: full citation, abstract, references, index terms

Two major problems in schema integration are to identify correspondences between different conceptual schemas and to verify that the proposed correspondences are consistent with the semantics of the schemas. We propose a heuristic method, based on the use of Galois lattices, for identifying schema correspondences. We show how the results of this method can be checked for correctness by introducing a number of necessary conditions for schema mergeability. These conditions are formulated in t ...

13 Model independent assertions for integration of heterogeneous schemas

Stefano Spaccapietra, Christine Parent, Yann Dupont

July 1992 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 1 Issue 1

Publisher: Springer-Verlag New York, Inc.

Full text available: pdf(2.15 MB) Additional Information: full citation, abstract, references, citings

Due to the proliferation of database applications, the integration of existing databases into a distributed or federated system is one of the major challenges in responding to enterprises' information requirements. Some proposed integration techniques aim at providing database administrators (DBAs) with a view definition language they can use to build the desired integrated schema. These techniques leave to the DBA the responsibility of appropriately restructuring schema elements from existing I ...

Keywords: conceptual modeling, database design and integration, distributed databases, federated databases, heterogeneous databases, schema integration

14 Managing semantic heterogeneity in databases: a theoretical prospective

Richard Hull

May 1997 **Proceedings of the sixteenth ACM SIGACT-SIGMOD-SIGART symposium on Principles of database systems**

Publisher: ACM Press

Full text available: pdf(1.77 MB) Additional Information: full citation, references, citings, index terms

15 Object orientation in multidatabase systems

Evaggelia Pitoura, Omran Bukhres, Ahmed Elmagarmid

June 1995 **ACM Computing Surveys (CSUR)**, Volume 27 Issue 2

Publisher: ACM Press

Full text available: pdf(4.65 MB) Additional Information: full citation, abstract, references, citings, index terms, review

A multidatabase system (MDBS) is a confederation of preexisting distributed, heterogeneous, and autonomous database systems. There has been a recent proliferation of research suggesting the application of object-oriented techniques to facilitate the complex task of designing and implementing MDBSs. Although this approach seems promising, the lack of a general framework impedes any further development. The goal of this paper is to provide a concrete analysis and categorization of the various ...

Keywords: distributed objects, federated databases, integration, multidatabases, views

16 The model-assisted global query system for multiple databases in distributed enterprises

Waiman Cheung, Cheng Hsu

October 1996 **ACM Transactions on Information Systems (TOIS)**, Volume 14 Issue 4

Publisher: ACM Press

Full text available: pdf(597.73 KB) Additional Information: full citation, abstract, references, citings, index terms

Today's enterprises typically employ multiple information systems, which are independently developed, locally administered, and different in logical or physical designs. Therefore, a fundamental challenge in enterprise information management is the sharing of information for enterprise users across organizational boundaries; this requires a global query system capable of providing on-line intelligent assistance to users. Conventional technologies, such as schema-based query languages and ha ...

17 Business process oriented information management: conceptual models at work

P. Peters, P. Szczurko, M. Jarke, M. Jeusfeld

August 1995 **Proceedings of conference on Organizational computing systems**

Publisher: ACM Press

Full text available: pdf(1.43 MB) Additional Information: full citation, abstract, references, index terms

The reorganization of function-oriented, hierachically structured firms into interacting business process networks of functional islands integrated by flow of material and information is a major challenge for a company that wants to meet the steadily changing business demands of today. As information has become an important production resource during the last decades, the reorganization of information management has to accompany organizational restructuring. In this paper we propose ...

18 HODFA: an architectural framework for homogenizing heterogeneous legacy databases

Kamalakar Karlapalem, Qing Li, Chung-Dak Shum

March 1995 **ACM SIGMOD Record**, Volume 24 Issue 1

Publisher: ACM Press

Full text available: pdf(653.76 KB) Additional Information: full citation, abstract, index terms

One of the main difficulties in supporting global applications over a number of localized databases and migrating legacy information systems to modern computing environment is to cope with the heterogeneities of these systems. In this paper, we present a *novel flexible architecture* (called HODFA) to dynamically connect such localized heterogeneous databases in forming a *homogenized federated database system* and to support the process of transforming a collection of heterogeneous in ...

19 Semantic and schematic similarities between database objects: a context-based approach

Vipul Kashyap, Amit Sheth

December 1996 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 5 Issue 4

Publisher: Springer-Verlag New York, Inc.

Full text available: pdf(287.44 KB) Additional Information: full citation, abstract, citings, index terms

In a multidatabase system, schematic conflicts between two objects are usually of interest only when the objects have some semantic similarity. We use the concept of *semantic proximity*, which is essentially an *abstraction/mapping* between the domains of the two objects associated with the *context of comparison*. An explicit though partial context representation is proposed and the specificity relationship between contexts is defined. The contexts are organized as a meet semi-l ...

20 A flexible reference architecture for distributed database management

James A. Larson

March 1985 **Proceedings of the 1985 ACM thirteenth annual conference on Computer Science**

Publisher: ACM Press

Full text available: pdf(1.20 MB) Additional Information: full citation, references, index terms

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Relevance scale

21 First-class views: a key to user-centered computing
Arnon Rosenthal, Edward Sciore
September 1999 **ACM SIGMOD Record**, Volume 28 Issue 3
Publisher: ACM Press
Full text available: pdf(597.27 KB) Additional Information: full citation, abstract, citings, index terms

Large database systems (e.g., federations, warehouses) are multi-layer — i.e., a combination of base databases and (virtual or physical) view databases1. Smaller systems use views for layers that hide detailed physical and conceptual structures. We argue that most databases would be more effective if they were more user-centered — i.e., if they allowed users, administrators, and application ...

22 A formal specification model and its application in multidatabase systems
Jianchun Zhang
October 1994 **Proceedings of the 1994 conference of the Centre for Advanced Studies on Collaborative research**
Publisher: IBM Press
Full text available: pdf(179.85 KB) Additional Information: full citation, abstract, references, index terms

The concept of a common data model is central to the process of schema integration in multidatabase systems. The common data model is used to represent the sharable knowledge of each component database system and, as such, must have at least the same representational power as any of the local data models.This paper examines the applicability of formal specification languages and techniques to the design of a common data model. The result is a common data model, called the formal specification mo ...

23 Query processing over object views of relational data
Gustav Fahl, Tore Risch
November 1997 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 6 Issue 4
Publisher: Springer-Verlag New York, Inc.
Full text available: pdf(454.31 KB) Additional Information: full citation, abstract, citings, index terms

This paper presents an approach to *object view* management for relational databases. Such a view mechanism makes it possible for users to transparently work with data in a relational database as if it was stored in an object-oriented (OO) database. A query against the object view is translated to one or several queries against the relational database. The results of these queries are then processed to form an answer to the initial query. The approach is not restricted to a 'pure&rsqu ...

Keywords: Object views, Object-oriented federated databases, Query optimization, Relational databases, query processing

24 Notes on DDTS: an apparatus for experimental research in distributed database management systems
Ramez Elmasri, Cory Devor, Said Rahimi
June 1981 **ACM SIGMOD Record**, Volume 11 Issue 4
Publisher: ACM Press
Full text available: pdf(833.44 KB) Additional Information: full citation, references

25 Constructing information systems based on schema reuse

Wen-Syan Li, Richard D. Holowczak
November 1996 **Proceedings of the fifth international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(945.90 KB) Additional Information: full citation, references, index terms

26 Research issues in federated database systems: report of EFDBS '97 workshop
S. Conrad, B. Eaglestone, W. Hasselbring, M. Roantree, M. Schöhoff, M. Strässler, M. Vermeer, F. Saltor
December 1997 **ACM SIGMOD Record**, Volume 26 Issue 4
Publisher: ACM Press
Full text available: pdf(225.00 KB) Additional Information: full citation, abstract, citings, index terms

In June 1997, an international workshop on engineering of federated database systems has been held in Barcelona in conjunction with the 9th Conference on Advanced Information Systems Engineering (CAiSE'97). This paper reports on the results of this workshop and summarises the identified open issues for future research in this area.

27 Graphical interaction with heterogeneous databases
T. Catarci, G. Santucci, J. Cardiff
May 1997 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 6 Issue 2
Publisher: Springer-Verlag New York, Inc.
Full text available: pdf(602.82 KB) Additional Information: full citation, abstract, citings, index terms

During the past few years our research efforts have been inspired by two different needs. On one hand, the number of non-expert users accessing databases is growing apace. On the other, information systems will no longer be characterized by a single centralized architecture, but rather by several heterogeneous component systems. In order to address such needs we have designed a new query system with both user-oriented and multidatabase features. The system's main components are an adaptive visua ...

28 Towards efficient and scalable mediation: the AURORA approach
Ling Ling Yan
November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**
Publisher: IBM Press
Full text available: pdf(344.59 KB) Additional Information: full citation, abstract, references, index terms

We develop a 2-tier, plug-and-play mediation model for accessing a large number of heterogeneous data sources. This model defines a divide-and-conquer approach towards information integration. It is more suitable for applications such as electronic commerce than existing models. We also develop algebras that manipulate heterogeneous data, the *mediation enabling algebras*, that provide new techniques for efficient query processing in large-scale middleware. This paper presents the mediation ...

29 On the duality of distributed database and distributed AI systems
Mike P. Papazoglou
December 1993 **Proceedings of the second international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(1.11 MB) Additional Information: full citation, references, citings, index terms

30 Context interchange: overcoming the challenges of large-scale interoperable database systems in a dynamic environment
Cheng Hian Goh, Stuart E. Madnick, Michael D. Siegel
November 1994 **Proceedings of the third international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(1.12 MB) Additional Information: full citation, abstract, references, citings, index terms

Research in database interoperability has primarily focused on circumventing schematic and semantic incompatibility arising from autonomy of the underlying databases. We argue that, while existing integration strategies might provide satisfactory support for small or static systems, their inadequacies rapidly become evident in large-scale interoperable database systems operating in a dynamic environment. This paper highlights the problem of receiver heterogeneity, scalability,

31 Schema translation using structural transformation
Rateb Abu-Hamdeh, James R. Cordy, Patrick Martin
October 1994 **Proceedings of the 1994 conference of the Centre for Advanced Studies on Collaborative research**
Publisher: IBM Press
Full text available: Additional Information:

pdf(196.83 KB) full citation, abstract, references, index terms

This paper describes how structural transformation can be applied to the problem of translating schemas expressed in one data model into equivalent schemas expressed in another data model. We explain our approach to the problem which involves translating a schema in the source data model into a set of facts in a knowledge base and from there into a schema in the target data model. We present an example transformation in detail and outline how one can analyze the information capacity preserving p ...

32 Application of object-oriented technology for integrating heterogeneous database systems
Bhavani Thuraisingham
February 1995 **Proceedings of the 1995 ACM 23rd annual conference on Computer science**
Publisher: ACM Press
Full text available: pdf(859.19 KB) Additional Information: full citation, references, index terms

33 Multidatabase Interoperability
Y. Breitbart
September 1990 **ACM SIGMOD Record**, Volume 19 Issue 3
Publisher: ACM Press
Full text available: pdf(892.50 KB) Additional Information: full citation, citings

34 Report on the 5th international workshop on knowledge representation meets databases (KRDB'98)
Alex Borgida, Vinay K. Chaudhri, Martin Staudt
September 1998 **ACM SIGMOD Record**, Volume 27 Issue 3
Publisher: ACM Press
Full text available: pdf(682.78 KB) Additional Information: full citation, index terms

35 Facilitating transformations in a human genome project database
S. B. Davidson, A. S. Kosky, B. Eckman
November 1994 **Proceedings of the third international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(994.91 KB) Additional Information: full citation, abstract, references, index terms

Human Genome Project databases present a confluence of interesting database challenges: rapid schema and data evolution, complex data entry and constraint management, and the need to integrate multiple data sources and software systems which range over a wide variety of models and formats. While these challenges are not necessarily unique to biological databases, their combination, intensity and complexity are unusual and make automated solutions imperative. We illustrate these problems in ...

36 The intrinsic problems of structural heterogeneity and an approach to their solution
Theo Härder, Günter Sauter, Joachim Thomas
April 1999 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 8 Issue 1
Publisher: Springer-Verlag New York, Inc.
Full text available: pdf(132.99 KB) Additional Information: full citation, abstract, citings, index terms

This paper focuses on the problems that arise when integrating data from heterogeneous sources in a single, unified database view. At first, we give a detailed analysis of the kinds of structural heterogeneity that occur when unified views are derived from different database systems. We present the results in a multiple tier architecture which distinguishes different levels of heterogeneity and relates them to their underlying causes as well as to the mapping conflicts resulting from the view de ...

Keywords: Heterogeneity, Legacy systems, Mapping language, Schema integration, Schema mapping, Updatable views

37 Building concept hierarchies for schema integration in HDDBS using incremental concept formation
Cyrus Azarbod, William Perrizo
December 1993 **Proceedings of the second international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(338.29 KB) Additional Information: full citation, references, index terms

38 An extensible knowledge base management system for supporting rule-based interoperability among heterogeneous systems

Stanley Y. W. Su, Herman Lam, Javier Arroyo-Figueroa, Tsae-Feng Yu, Zhidong Yang

December 1995 **Proceedings of the fourth international conference on Information and knowledge management**

Publisher: ACM Press

Full text available: pdf(1.17 MB) Additional Information: full citation, references, index terms

39 Database research at Bellcore

September 1990 **ACM SIGMOD Record**, Volume 19 Issue 3

Publisher: ACM Press

Full text available: pdf(722.69 KB) Additional Information: full citation

40 The OASIS multidatabase prototype

Mark Roantree, John Murphy, Wilhelm Hasselbring

March 1999 **ACM SIGMOD Record**, Volume 28 Issue 1

Publisher: ACM Press

Full text available: pdf(672.40 KB) Additional Information: full citation, abstract, citings, index terms

The OASIS Prototype is under development at Dublin City University in Ireland. We describe a multi-database architecture which uses the ODMG model as a canonical model and describe an extention for construction of virtual schemas within the multidatabase system. The OMG model is used to provide a standard distribution layer for data from local databases. This takes the form of CORBA objects representing export schemas from separate data sources.

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Relevance scale

41 Query evaluation techniques for large databases
Goetz Graefe
June 1993 **ACM Computing Surveys (CSUR)**, Volume 25 Issue 2
Publisher: ACM Press
Full text available: pdf(9.37 MB) Additional Information: full citation, abstract, references, citings, index terms, review

Database management systems will continue to manage large data volumes. Thus, efficient algorithms for accessing and manipulating large sets and sequences will be required to provide acceptable performance. The advent of object-oriented and extensible database systems will not solve this problem. On the contrary, modern data models exacerbate the problem: In order to manipulate large sets of complex objects as efficiently as today's database systems manipulate simple records, query-processi ...

Keywords: complex query evaluation plans, dynamic query evaluation plans, extensible database systems, iterators, object-oriented database systems, operator model of parallelization, parallel algorithms, relational database systems, set-matching algorithms, sort-hash duality

42 Agent-based semantic interoperability in infosleuth
Jerry Fowler, Brad Perry, Marian Nodine, Bruce Bargmeyer
March 1999 **ACM SIGMOD Record**, Volume 28 Issue 1
Publisher: ACM Press
Full text available: pdf(1.01 MB) Additional Information: full citation, citings, index terms

43 Semantic interoperability in information services: experiencing with CoopWARE
Avigdor Gal
March 1999 **ACM SIGMOD Record**, Volume 28 Issue 1
Publisher: ACM Press
Full text available: pdf(805.03 KB) Additional Information: full citation, citings, index terms

44 Practical inter-operation of CAD tools using a flexible procedural interface
Zahir Moosa, Nick Filer, Mike Brown, J. Heaton, J. Pye
December 1995 **Proceedings of the conference on European design automation**
Publisher: IEEE Computer Society Press
Full text available: pdf(649.59 KB) Additional Information: full citation, references, index terms

45 Version models for software configuration management
Reidar Conradi, Bernhard Westfechtel
June 1998 **ACM Computing Surveys (CSUR)**, Volume 30 Issue 2
Publisher: ACM Press
Full text available: pdf(483.54 KB) Additional Information: full citation, abstract, references, citings, index terms

After more than 20 years of research and practice in software configuration management (SCM), constructing consistent configurations of versioned software products still remains a challenge. This article focuses on the version models underlying both commercial systems and research prototypes. It provides an overview and classification of different versioning paradigms and defines and relates

fundamental concepts such as revisions, variants, configurations, and changes. In particular, we foc ...

Keywords: changes, configuration rules, configurations, revisions, variants, versions

46 The EGG/YOLK reliability hierarchy: semantic data integration using sorts with prototypes
Fritz Lehmann, Anthony G. Cohn
November 1994 **Proceedings of the third international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(1.01 MB) Additional Information: full citation, abstract, references, index terms

Integration of disparate heterogeneous databases requires translation of types. Because a type in one system often has no exact counterpart in the others, fully reliable integration requires deep understanding of the subject domain, with conceptual analysis of type meanings. So far, reliable translation has had to be done by hand. In practice, few types are so crucial as to require full reliability. The EGG/YOLK hierarchy ranks types by the tolerable rashness in translation, ba ...

Keywords: data translation, database integration, formal concept lattice, order theory, poset, prototypes, semantic integration, spatial reasoning, view integration

47 Multidatabase systems: Multidatabase services: issues and architectural design
Neil Coburn, Per-Åke Larson
November 1992 **Proceedings of the 1992 conference of the Centre for Advanced Studies on Collaborative research - Volume 2**
Publisher: IBM Press
Full text available: pdf(719.40 KB) Additional Information: full citation, abstract, references, citings

It is common for (distributed) applications to require access to multiple databases and other data sources. Such access can be facilitated by the use of a *multidatabase* system. A multidatabase eases the burden on the application programmer by providing a layer of integrating and coordinating services that acts as a front-end to each component database system. Ideally, the user is presented with a single, uniform view of the (virtual) multidatabase and is unaware of the autonomy, heterogen ...

48 A semantic meta-modelling approach to schema transformation
Mike P. Papazoglou, Nick Russell
December 1995 **Proceedings of the fourth international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(951.04 KB) Additional Information: full citation, references, citings, index terms

49 Integrating modelling systems for environmental management information systems
David J. Abel, Kerry Taylor, Dean Kun
March 1997 **ACM SIGMOD Record**, Volume 26 Issue 1
Publisher: ACM Press
Full text available: pdf(182.34 KB) Additional Information: full citation, abstract, index terms

Special purpose modelling packages can become more accessible and more effective for decision support when integrated into a spatial information system. Integration is made difficult by differences in the models due to scope, underlying data models, and command languages. This paper extends a federated information systems design methodology and architecture by identifying parallels of the model integration problem with the database integration problem in federated database design. A schema archi ...

50 Conflicts and correspondence assertions in interoperable databases
Stefano Spaccapietra, Christine Parent
December 1991 **ACM SIGMOD Record**, Volume 20 Issue 4
Publisher: ACM Press
Full text available: pdf(516.07 KB) Additional Information: full citation, index terms

51 Integrating information requirements along processes: a survey and research directions
C. Francalanci, A. Fuggetta
January 1997 **ACM SIGSOFT Software Engineering Notes**, Volume 22 Issue 1
Publisher: ACM Press
Full text available: pdf(960.87 KB) Additional Information: full citation, abstract, index terms

Information requirements have traditionally been collected separately for different business

functions and then integrated into an overall specification. The recent orientation to a process perspective in managing business activities has emphasized early integration, by concurrently analyzing business processes and information requirements. Accordingly, information requirements analysis methodologies should take into account these new integration needs. In the paper, we discuss these new integra ...

52 Database research at Arizona State University

Susan D. Urban, Suzanne W. Dietrich, Forouzan Golshani

March 1996 **ACM SIGMOD Record**, Volume 25 Issue 1

Publisher: ACM Press

Full text available: pdf(605.65 KB) Additional Information: full citation

53 Building a federation of process support systems

Jacky Estublier, Mahfound Amiour, Samir Dami

March 1999 **ACM SIGSOFT Software Engineering Notes , Proceedings of the international joint conference on Work activities coordination and collaboration WACC '99**, Volume 24 Issue 2

Publisher: ACM Press

Full text available: pdf(1.31 MB) Additional Information: full citation, abstract, references, citings, index terms

The effort in software process support has focused so far on modeling and enacting processes. A certain amount of work has been done, but little has reached a satisfactory level of maturity and acceptance. In our opinion, this is due to the difficulty for a system to accommodate the very numerous aspects involved in software processes. A complete process support should cover topics ranging from low level tasks (like compiling) to organizational and strategic tasks. This includes process enhancem ...

Keywords: architecture, federation, interoperability, process, process support system

54 Data modeling: Constructing superviews

Amihai Motro, Peter Buneman

April 1981 **Proceedings of the 1981 ACM SIGMOD international conference on Management of data**

Publisher: ACM Press

Full text available: pdf(989.78 KB) Additional Information: full citation, abstract, references, citings

A method is described for integrating two or more databases into a conceptual "superview", through a set of schema transformations. Such integration may be useful when it is required to produce a unified view of two databases while preserving their physical independence. Each transformation defines a mapping of queries against the superview into the appropriate set of queries against the underlying databases and imposes a constraint that is checked when the query is evaluated. A program that int ...

55 Context interchange: new features and formalisms for the intelligent integration of information

Cheng Hian Goh, Stéphane Bressan, Stuart Madnick, Michael Siegel

July 1999 **ACM Transactions on Information Systems (TOIS)**, Volume 17 Issue 3

Publisher: ACM Press

Full text available: pdf(184.03 KB) Additional Information: full citation, abstract, references, citings, index terms, review

The Context Interchange strategy presents a novel perspective for mediated data access in which semantic conflicts among heterogeneous systems are not identified a priori, but are detected and reconciled by a context mediator through comparison of contexts axioms corresponding to the systems engaged in data exchange. In this article, we show that queries formulated on shared views, export schema, and shared "ontologies" can be ...

Keywords: abductive reasoning, information integration, mediators, semantic heterogeneity, semantic interoperability

56 Semantics-based information brokering

Vipul Kashyap, Amit Sheth

November 1994 **Proceedings of the third international conference on Information and knowledge management**

Publisher: ACM Press

Full text available: pdf(864.46 KB) Additional Information: full citation, abstract, references, citings, index terms

The rapid advances in computer and communication technologies, and their merger, is leading to a global information market place. It will consist of federations of very large number of information systems that will cooperate to varying extents to support the users' information needs. We discuss an approach to information brokering in the above environment. We discuss two of its tasks: information resource discovery, which identifies relevant information sou ...

57 InfoSleuth: agent-based semantic integration of information in open and dynamic environments

R. J. Bayardo, W. Bohrer, R. Brice, A. Cichocki, J. Fowler, A. Helal, V. Kashyap, T. Ksiezyk, G. Martin, M. Nodine, M. Rashid, M. Rusinkiewicz, R. Shea, C. Unnikrishnan, A. Unruh, D. Woelk

June 1997 **ACM SIGMOD Record , Proceedings of the 1997 ACM SIGMOD international conference on Management of data SIGMOD '97**, Volume 26 Issue 2

Publisher: ACM Press

Full text available: pdf(1.69 MB) Additional Information: full citation, abstract, references, citings, index terms

The goal of the InfoSleuth project at MCC is to exploit and synthesize new technologies into a unified system that retrieves and processes information in an ever-changing network of information sources. InfoSleuth has its roots in the Carnot project at MCC, which specialized in integrating heterogeneous information bases. However, recent emerging technologies such as internetworking and the World Wide Web have significantly expanded the types, availability, and volume of data available to a ...

58 Scientific modeling using distributed resources

Amitabh Saran, Divyakant Agrawal, Amr El Abbadi, Terence R. Smith, Jianwen Su

November 1996 **Proceedings of the 4th ACM international workshop on Advances in geographic information systems**

Publisher: ACM Press

Full text available: pdf(1.00 MB) Additional Information: full citation, references, index terms

59 Evaluation of hypermedia application development and management systems

S. P. Christodoulou, G. D. Styliaras, T. S. Papatheodrou

May 1998 **Proceedings of the ninth ACM conference on Hypertext and hypermedia : links, objects, time and space---structure in hypermedia systems: links, objects, time and space---structure in hypermedia systems**

Publisher: ACM Press

Full text available: pdf(1.48 MB) Additional Information: full citation, references, citings, index terms

60 Temporal databases status and research directions

Richard Snodgrass

December 1990 **ACM SIGMOD Record**, Volume 19 Issue 4

Publisher: ACM Press

Full text available: pdf(620.71 KB) Additional Information: full citation, abstract, citings, index terms

It seems somehow fitting to begin this paper on databases that store historical information with a chronology, touching briefly on all work that I am aware of in this area. I discuss in some detail what I consider to be the ten most important papers and events in terms of their impact on the discipline of temporal databases. These are emphatically not meant to detract from the other excellent papers in temporal databases. My goal is to characterize the evolution of this field, as an introdu ...

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and Published before September 1999
Terms used federated database schema view conceptual

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Relevance scale

61 Metadatabase solutions for enterprise information integration problems
Cheng Hsu, Laurie Rattner
January 1993 **ACM SIGMIS Database**, Volume 24 Issue 1
Publisher: ACM Press
Full text available: pdf(1.29 MB) Additional Information: full citation, abstract, index terms

The success of modern information technology in the past decades has brought about the proliferation of systems dedicated to individual groups of applications and functions. This proliferation, in turn, has led to the need for enterprise-wide management and integration of information, and has triggered major efforts such as systems integration, re-engineering, and computer integrated manufacturing. Nonetheless, achieving such integration remains a challenge.To effectively manage information reso ...

62 A configurable approach for object sharing among multidatabase systems
Jian Yang, Mike P. Papazoglou
December 1995 **Proceedings of the fourth international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(775.57 KB) Additional Information: full citation, references, index terms

63 The integrity subsystem of a distributed database system for workstations
Andreas Diener, Andreas Dudler
March 1985 **Proceedings of the 1985 ACM thirteenth annual conference on Computer Science**
Publisher: ACM Press
Full text available: pdf(1.14 MB) Additional Information: full citation, abstract, references, citings, index terms

Database Management Systems represent important tools for professional applications of inter-connected workstations. This paper presents the integrity subsystem of such a DBMS. Private and shared data are distinguished, as well as an original and possibly several duplicates. It is shown which kinds of integrity constraints across the borders of private and shared data are possible, and a data definition system is described which guides the user towards a complete definition of integrity con ...

Keywords: data integrity, data replication, database design, distributed database, professional workstation, transaction

64 Interoperability as a means of articulation work
Carla Simone, Gloria Mark, Dario Giubbilei
March 1999 **ACM SIGSOFT Software Engineering Notes , Proceedings of the international joint conference on Work activities coordination and collaboration WACC '99**, Volume 24 Issue 2
Publisher: ACM Press
Full text available: pdf(1.37 MB) Additional Information: full citation, abstract, references, citings, index terms

The interoperability of systems to support cooperative work requires moving beyond purely technical issues; it also concerns the means and practices that users adopt to articulate their cooperative activities. Articulation has to be supported by a technology which focuses on this higher level of interoperability. This claim is motivated by observing the articulation process of users in real cooperative work practice. Based on this study, the functionality for this technology was designed to help ...

Keywords: architectures, awareness, cooperative work, groupware conventions, interoperability

65 The Asilomar report on database research

Phil Bernstein, Michael Brodie, Stefano Ceri, David DeWitt, Mike Franklin, Hector Garcia-Molina, Jim Gray, Jerry Held, Joe Hellerstein, H. V. Jagadish, Michael Lesk, Dave Maier, Jeff Naughton, Hamid Pirahesh, Mike Stonebraker, Jeff Ullman

December 1998 **ACM SIGMOD Record**, Volume 27 Issue 4

Publisher: ACM Press

Full text available: pdf(660.48 KB) Additional Information: full citation, abstract, citings, index terms

The database research community is rightly proud of success in basic research, and its remarkable record of technology transfer. Now the field needs to radically broaden its research focus to attack the issues of capturing, storing, analyzing, and presenting the vast array of online data. The database research community should embrace a broader research agenda — broadening the definition of database management to embrace all the content of the Web and other online data stores, and ret ...

66 Toward megaprogramming

Gio Wiederhold, Peter Wegner, Stefano Ceri

November 1992 **Communications of the ACM**, Volume 35 Issue 11

Publisher: ACM Press

Full text available: pdf(3.93 MB) Additional Information: full citation, references, citings, index terms, review

Keywords: mega programming languages and systems

67 Applying active database models for simulation

A. Cornelio, Shamkant B. Navathe

December 1993 **Proceedings of the 25th conference on Winter simulation**

Publisher: ACM Press

Full text available: pdf(926.40 KB) Additional Information: full citation, references, citings

68 Data management research at the MITRE Corporation

Arnon Rosenthal, Len Seligman, Catherine McCollum, Barbara Blaustein, Bhavani Thuraisingham, Edward Lafferty

September 1995 **ACM SIGMOD Record**, Volume 24 Issue 3

Publisher: ACM Press

Full text available: pdf(23.73 KB) Additional Information: full citation, abstract, index terms

The MITRE Corporation provides technical assistance, system engineering, and acquisition support to large organizations, especially U.S. Government agencies. We help our customers to plan complex systems based on emerging technologies, and to implement systems based on commercial-off-the-shelf products. In MITRE's research program, instead of emphasizing concerns of DBMS or CASE vendors, our research emphasizes the issues of organizations who need to use such products. For example, we favor area ...

69 Facilitating connectivity in composite information systems

Richard Wang, Stuart E. Madnick

June 1989 **ACM SIGMIS Database**, Volume 20 Issue 3

Publisher: ACM Press

Full text available: pdf(941.70 KB) Additional Information: full citation, abstract, citings, index terms

Timely access to multiple disparate databases which were independently developed and administered to produce composite information has become increasingly critical for organizations to gain competitive advantage. However, many inter-database problems such as inconsistency, ambiguity, and contradiction remain unresolved. This paper presents an approach for resolving these problems. The techniques employed in this approach include schema integration, inter-database tables, attribute subsetting, ob ...

70 Semantic heterogeneity in distributed geographic databases

M. F. Worboys, S. M. Deen

December 1991 **ACM SIGMOD Record**, Volume 20 Issue 4

Publisher: ACM Press

Full text available: pdf(508.53 KB) Additional Information: full citation, abstract, index terms

This paper considers the special problems of semantic heterogeneity in a distributed system of databases containing spatially referenced information. Two forms of semantic heterogeneity are

defined. Generic semantic heterogeneity arises when nodes are using different generic conceptual models of the spatial information. Contextual semantic heterogeneity is caused by the particular local environmental conditions at nodes. It is contextual heterogeneity w ...

71 An incremental approach to schema integration by refining extensional relationships
Ingo Schmitt, Can Türker
November 1998 **Proceedings of the seventh international conference on Information and knowledge management**
Publisher: ACM Press
Full text available: pdf(1.34 MB) Additional Information: full citation, references, citings, index terms

72 Strategic directions in electronic commerce and digital libraries: towards a digital agora
Nabil Adam, Yelena Yesha
December 1996 **ACM Computing Surveys (CSUR)**, Volume 28 Issue 4
Publisher: ACM Press
Full text available: pdf(244.34 KB) Additional Information: full citation, references, citings, index terms

73 Outerjoin simplification and reordering for query optimization
César Galindo-Legaria, Arnon Rosenthal
March 1997 **ACM Transactions on Database Systems (TODS)**, Volume 22 Issue 1
Publisher: ACM Press
Full text available: pdf(618.82 KB) Additional Information: full citation, references, citings, index terms, review

Keywords: outerjoins, query optimization, query reordering

74 System integration in multidatabases
P. Bodorik, J. S. Riordon
February 1990 **Proceedings of the 1990 ACM SIGSMALL/PC symposium on Small systems**
Publisher: ACM Press
Full text available: pdf(383.92 KB) Additional Information: full citation, abstract, references, index terms

— This paper presents an exploratory approach to the development of a tool for integrating existing databases. The intent is to meet specific requirements and to achieve flexibility through the creation of an "open" system. The methodology assumes an integration model which captures the essential characteristics of a distributed system within a knowledge base. The model and the underlying knowledge base may be used to represent the distributed environment and to define req ...

75 Semantic interoperability in global information systems
A. M. Ouksel, A. Sheth
March 1999 **ACM SIGMOD Record**, Volume 28 Issue 1
Publisher: ACM Press
Full text available: pdf(984.86 KB) Additional Information: full citation, abstract, citings, index terms

Internet, Web and distributed computing infrastructures continue to gain in popularity as a means of communication for organizations, groups and individuals alike. In such an environment, characterized by large distributed, autonomous, diverse, and dynamic information sources, access to relevant and accurate information is becoming increasingly complex. This complexity is exacerbated by the evolving system, semantic and structural heterogeneity of these potentially global, cross-disciplinar ...

76 Automated support for seamless interoperability in polylingual software systems
Daniel J. Barrett, Alan Kaplan, Jack C. Wileden
October 1996 **ACM SIGSOFT Software Engineering Notes , Proceedings of the 4th ACM SIGSOFT symposium on Foundations of software engineering SIGSOFT '96**, Volume 21 Issue 6
Publisher: ACM Press
Full text available: pdf(995.97 KB) Additional Information: full citation, abstract, references, citings, index terms

Interoperability is a fundamental concern in many areas of software engineering, such as software reuse or infrastructures for software development environments. Of particular interest to software engineers are the interoperability problems arising in *polylingual* software systems. The defining characteristic of polylingual systems is their focus on uniform interaction among a set of components written in two or more different languages.Existing approaches to support for interoperability a ...

77 Experiments on using semantic distances between words in image caption retrieval
Alan F. Smeaton, Ian Quigley

August 1996 **Proceedings of the 19th annual international ACM SIGIR conference on Research and development in information retrieval**
Publisher: ACM Press
Full text available: pdf(791.78 KB) Additional Information: full citation, references, citings, index terms

78 Assessing data quality for information products
Amir Parssian, Sumit Sarkar, Varghese S. Jacob
January 1999 **Proceeding of the 20th international conference on Information Systems**
Publisher: Association for Information Systems
Full text available: pdf(208.26 KB) Additional Information: full citation, references, index terms

Results 61 - 78 of 78 Result page: previous 1 2 3 **4**